CUMULATED INTERNAL DOSE OF NATURAL URANIUM IN WORKERS OF AN INDUSTRIAL AREA NEAR A FERTILIZER PRODUCTION PLANT

Rocío Capelo, *Universidad de Huelva, Spain*
Miguel Ángel García, *Universidad de Huelva, Spain*
Rosa Galisteo, *Universidad de Huelva, Spain*
Rocío Jara, *Universidad de Huelva, Spain*
Eva Buller, *Hospital Punta Europa, Spain*
Francisco Javier Caballero, *Hospital Infanta Elena, Spain*
Antonio Pereira, *Hospital Juan Ramón Jiménez, Spain*
Jesús de la Rosa, *Universidad de Huelva, Spain*
Jose Luis Gómez-Ariza, *Universidad de Huelva, Spain*
Juan Alguacil, *Universidad de Huelva, Spain*

Background: Natural uranium is a low radioactive element that decays slowly by emitting an alpha particle. If absorbed, uranium can damage human health. Working nearby and at a fertilizer production plant might be an important source of exposure to natural uranium. We compared cumulative dose of uranium between workers from a fertilizer plant, chemical/metal workers from the same industrial park, chemical/metal workers from industrial parks of other regions, and workers unexposed to metals.
Methods: Cross-sectional epidemiological study design. We obtained satisfactory results of uranium-238 levels in toenails of 5 workers of a fertilizer production plant, 44 workers of the chemical/metal industry at the same industrial park, 24 workers of the chemical/metal industry from industrial parks of other regions, and of 43 workers unexposed to metals from the service sector. Internal dose of uranium-238 was measured by emission spectroscopy by ICP-MS with collision cells.
Results: The median of the cumulated dose of uranium-238 among the group including all 63 chemical/metal industry workers was 4.9 ppb; and 3.5 ppb in the group of the 43 unexposed workers ($p<0.001$; U Mann-Whitney test). The median of uranium-238 in the group of fertilizer plant workers was 6.5 ppb; 4.9 ppb among chemical/metal industry workers from the same industrial park, and 4.5 ppb among chemical/metal industry workers from industrial parks without fertilizer plants from other regions ($p=0.056$; Median test).
Conclusions: Our results suggest that occupational activity on the chemical/metal industry is related to accumulation of natural uranium, mostly among workers from fertilizing plants.